

**The Successes and Shortcomings of Implementing Environmental Health Policies in Health
Care Facilities: the case of Malawi**

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Abstract

Establishing and maintaining safe, sufficient and effective Environmental Health (EH) conditions in health care facilities (HCFs), largely through water, sanitation and hygiene interventions, is critical to preventing and controlling infections and disseminating environmental health education. Malawi has recently drafted an EH policy with specific targets for HCFs, but there has been incomplete and unequal implementation of the policy. This study assesses the shortcomings and successes of implementing this and other EH related policies in Malawi's HCFs. Through 53 interviews with EH officials from Malawi's Ministry of Health, with representatives from the national to community level, we evaluate the implementation of these policies using Contextual Interaction Theory (CIT). Identified barriers include: limited political and financial support for and prioritization of the EH department; inadequate community mobilization; insufficient knowledge of policies and training of EH officials; staffing gaps in the EH working system leading to incomplete reporting and supervision; and poor coordination with external actors leading to inefficient use of external resources to address existing service gaps. Respondents offered several solutions to these barriers, from which we propose several recommendations to improve the implementation process. Further research is needed to consider the cost-effectiveness and feasibility of these solutions to strengthen the implementation process within Malawi and elsewhere.

Acknowledgements

I would first like to thank my two advisors, Dr. Benjamin Meier and Dr. John Tomaro, for their support and mentorship throughout this process. Dr. Meier gave me full autonomy over the direction of my research, while Dr. Tomaro provided endless hours of detailed and constructive revision to draft after draft of my thesis. I would also like to thank Dr. Ryan Cronk for his guidance and advice throughout the life of this project, along with Frances Reuland for providing creative perspectives and never turning down the opportunity to brainstorm about the direction our theses might take. This work would not have been possible without the contributions of each and every member of the project team, including our Malawian counterparts Innocent Mofolo, Jennifer Tseka Mmodzi, Holystone Kafanikhale, and Caseby Banda, as well as those here at UNC including Dr. Jamie Bartram, Professor Irving Hoffman, Nikki Behnke, and Dr. Lydia Abebe.

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Abbreviations

EH	Environmental Health
HCF	Health Care Facility
IPC	Infection Prevention and Control
HCAI	Health Care Associated Infection
ICU	Intensive Care Unit
MMR	Maternal Mortality Ratio
LMIC	Low and Middle-Income Countries
WI	Water Institute
WHO	World Health Organization
UNICEF	United Nations International Children's Fund
WaSH	Water, Sanitation, and Hygiene
SDG	Sustainable Development Goals
JMP	Joint Monitoring Programme
MoH	Ministry of Health
SPA	Service Provision Assessment
DEHO	District Environmental Health Officer
EHO	Environmental Health Officer
AEHO	Assistant Environmental Health Officer
SHSA	Senior Health Surveillance Assistant
HSA	Health Surveillance Assistant
CEHO	Chief Environmental Health Officer
PEHO	Principal Environmental Health Officer

DDPHS—EH	Deputy Director for Preventive Health Services Responsible for Environmental Health
SEHO	Senior Environmental Health Officer
NGO	Non-Governmental Organization
CLTS	Community-Led Total Sanitation
CIT	Contextual Interaction Theory
DIP	District Implementation Plan

1. Introduction

Establishing and maintaining safe, sufficient and effective environmental health (EH) conditions in health care facilities (HCFs), including water supply, waste management, sanitation, and hand hygiene, is critical to preventing and controlling infections (IPC). Failing to provide such basic conditions has serious consequences. In high-income countries, for example, health care associated infections (HCAIs) affect 5-15% of patients and a higher percentage of patients in intensive care units (ICUs) (Nejad et al., 2011). While the percentages of HCAIs are not known precisely in low and middle-income countries because diagnosis and monitoring is a complex undertaking, it is estimated that HCAIs are 3-20 times higher, specifically among neonates (Negad et al., 2011). Inadequate environmental conditions create a particularly high disease burden for newborns and mothers. Such conditions have been associated with an increase in maternal and neonatal mortality (Lynch et al., 2007). Maternal mortality ratios (MMRs) in sub-Saharan Africa are among the highest in the world; Somalia, Chad, and South Sudan have MMRs of almost 1,000 deaths per 100,000 live births, largely because of inadequate water services, non-sterile medical equipment, and inadequate infection control procedures (UNICEF, 2015).

In addition, the effects of inadequate environmental conditions in health care settings extend beyond HCAIs. For example, in facilities where environmental health conditions are noticeably inadequate, (e.g. no available, safe water supply) women often do not trust the services and do not seek care. As a result, women may opt to give birth at home, instead of an HCF, and risk infection and, sometimes, death (WHO & UNICEF, 2015b). Moreover, evidence suggests that there is limited awareness about the connection between improved environmental conditions and reduction in HCAIs (Rehfuess, Bruce, & Bartram, 2009).

Health officials worldwide have given increasing attention to EH, as evident by its inclusion in the Sustainable Development Goals (United Nations, 2015). Despite this, less than one third of countries currently have policies or frameworks on EH in HCFs that are funded, implemented, and undergo regular review (WHO & UNICEF, 2015b). Even in cases where there are policies, the implementation process is often incomplete in low and middle-income countries (LMICs).

This research assesses the state of EH in Malawi's HCFs and examines the successes and shortcomings of implementing environmental health policies. We study the EH system in Malawi, a country with recently updated EH policies. By reviewing and documenting the process of implementation, reviewing and documenting gaps in implementation, we can assess the potential effectiveness of the new EH policies on HCAs and recommend potential measures to overcome the identified barriers.

2. Background

The consequences of inadequate environmental health conditions in HCFs have not been adequately addressed or assessed to date, although a global assessment of environmental health service levels within HCFs was conducted in 2015. This assessment of water, sanitation, and hygiene (WaSH) service levels in HCFs is useful in identifying low service areas and defining interventions to improve environmental health conditions.

The 2015 multi-country review of environmental health conditions in HCFs in low and middle-income countries was conducted by the Water Institute (WI) at the University of North Carolina for the World Health Organization (WHO) and United Nations Children's Fund (UNICEF). The study gathered data on 66,191 facilities operating in 54 countries, and found that 38% of HCFs did not have basic water services, 19% were without sanitation services and 35% did not have water and soap for handwashing (WHO & UNICEF, 2015b). These numbers could potentially be an underestimation of the true values because of data limitations and the absence of a common monitoring framework. For example, the data do not account for differences between facilities where water is accessible within the facility versus one where it is available in the community within 500 meters. These are quite different situations, and lack of access of water within a facility certainly presents challenges not addressed by these results. To address this, the JMP is working to develop a framework with indicators for monitoring WaSH related SDG targets with the expectations that countries and other groups monitoring WaSH activities, will begin to use the same framework for assessment. The 'ladders' for monitoring are drinking water, sanitation, handwashing, and, specifically for HCFs, waste management. This will also improve cross-country comparability of data.

Even when countries begin to use a common monitoring framework and the same indicators, data gaps are likely to remain as highlighted by the multi-country review. These data fail to capture the intra-regional, sub-national, and even inter-facility variations that often show higher percentages of HCFs without basic WaSH services in some locations (WHO & UNICEF, 2015b). For example, in Kenya, water coverage averaged 46% at the national level. However, when the data were disaggregated at the province level, coverage ranged from 22%-75% (WHO & UNICEF, 2015b). In Tanzania, 44% of facilities were found to have basic WaSH services, but this figure dropped to 24% when monitoring focused on the availability of functional WaSH services within delivery rooms, important information to collect given the particularly high infection burden in newborns (WHO & UNICEF, 2015b). These findings emphasize the importance of collecting sub-national and ward specific data in future assessments.

Another limitation of previous studies is their focus on simply water, sanitation, and hygiene. While these interventions have an important impact on HCAs, there are other interventions linked to achieving safe, effective environmental conditions in HCFs. Current monitoring instruments fail to address water quality, food safety, vector control, waste management, and energy (Cronk & Bartram, 2018). Including waste management in the JMP's framework for assessments within HCFs is likely to address the lack of data in this area, but interventions in food safety, occupational health and safety, vector and disease control, and emergencies and climate change still remain outside the framework.

The Sustainable Development Goals (SDGs), which define global goals and measurable targets for countries to achieve by 2030, recognize the importance of maintaining a safe environment in HCFs. As defined, Goal 6 states that countries are to 'ensure availability and sustainable management of water and sanitation for all' (UN, 2015). Targets 6.1 and 6.2 call for

‘universal access for all’, suggesting a shift from an exclusive focus on households to including institutions such as schools and HCFs (WHO & UNICEF, 2017b).

Since 1990, the WHO and UNICEF’s Joint Monitoring Programme (JMP) for Water Supply and Sanitation has been responsible for monitoring drinking water and sanitation. In monitoring basic WaSH service levels in schools and HCFs, the JMP has begun to develop a recommended set of core questions and indicators for assessing WaSH service levels (WHO & UNICEF, 2017b). In the HCF setting, health care waste management is being monitored in addition to drinking water, sanitation, and handwashing. The JMP is developing baseline estimates for WaSH in HCFs, which are to be published in 2018 (WHO & UNICEF, 2017b).

Despite the attention given to assessing environmental conditions in HCFs in the SDG era, many countries do not have policies and programs in place. Having a supportive policy environment enables stakeholders to govern and manage the planning, funding, and monitoring of WaSH service levels. Data from a sub-set of sub-Saharan African countries shows that water coverage is high (87%) in HCFs in countries with a water target and regularly reviewed national plan, compared to the African average of 58% (WHO & UNICEF, 2015b). This suggests that the existence of policies and plans contribute to higher WaSH service levels. However, there is a critical step between the existence of these policies and changes in service levels, i.e., the *implementation* of the policies.

In 2015, WHO launched an action plan for EH in HCFs that promoted improved policy, from its drafting through to the implementation of programs carried out in HCFs (WHO & UNICEF, 2015a). This action plan highlights the need for comprehensive assessments of the status of environmental health conditions in HCFs, and recognizes the need to have a better understanding of the relevant policy environments in low and middle-income countries. Even

when countries have specific policies or frameworks on WaSH in HCFs, there is often a lack of understanding of the broader policy environment, including strengths and weaknesses of the implementation process, barriers to implementation, and strengths and weaknesses of coordination mechanisms between relevant stakeholders.

Malawi has recently developed policies to address EH in HCFs. Until 2017, EH policies and programs were based on the 1948 Public Health Act (Public Health Act, 1948). This Act touches on outdated issues, such as the prevention of smallpox and makes no reference to the present EH working system or modern EH issues. With financial and technical support from the WHO, the Malawian Ministry of Health (MoH) has developed their EH policy along with a Health Care Waste Management policy and an updated National Community Health Strategy for 2017-2022 (including strategies related to environmental health in HCFs). The draft Environmental Health Policy addresses five themes: food safety and hygiene; health and safety; vector and disease prevention and control; water, sanitation, and hygiene; and emergencies, climate change and human health (Environmental Health Policy, 2017). While the drafts were only recently finalized, Malawi has been using these new policies to guide EH programs within HCFs for several years. There have been both successes and shortcomings throughout the process of implementing these draft policies. This study strives to identify and explain these factors, in light of the context of Malawi's decentralized working system, the importance of coordinating responsibilities across a wide range of environmental health stakeholders, and the extent of prioritization of environmental health within the MoH.

In 2013-2014, a service provision assessment (SPA) was conducted in 977 HCFs in Malawi; hospitals, health centers, dispensaries, clinics, and health posts were assessed. The findings documented a situation much worse than the averages recorded in the review of low and

middle-income countries globally (WHO & UNICEF, 2015b). Only 37% of facilities were found to have sanitation facilities available, only six in every ten facilities had both soap and water, and only six in ten facilities had regular electricity. Malawi, unsurprisingly has a neonatal mortality rate higher than the global average of 18.6, with 23.1 deaths per 1000 live births (UN Inter-Agency Group for Child Mortality Estimation, 2017). Also, environmental health risks were found to contribute to 52% of Malawi's disease burden in 2014 (Environmental Health Policy, 2017). Given the established link between environmental health conditions within HCFs and poor health outcomes, it is important to improve WaSH services and other interventions required to achieve safe environmental conditions (WHO, 2016).

Additionally, the objectives of the SPA are general, not charged with collecting a level of detail that might enable the MoH to identify and address priority problems. For example, the assessment did not distinguish between a functional and non-functional sanitation facility, whether it is public or private, whether it is handicap accessible, whether it is regularly cleaned/maintained, and whether there is a handwashing station close by, etc. These are all important considerations when considering overall levels of environmental health service provision. The JMP framework addressed several of these gaps. In effect, the SPA documented the inadequacy of environmental health provision in Malawi's HCFs rather than providing a useful tool for guiding interventions and improvements.

As better tools to document the levels of environmental health services are developed and applied, many of the gaps in the existing datasets can be closed. For example, better tools should be able to assess: (a) environmental health service levels in HCFs, including the utility and functionality of infrastructure; (b) the sub-national and intra-facility differences in environmental health service provision; (c) the environmental health policy environment and barriers to

implementing EH policies fully within HCFs. Comprehensive, countrywide assessments of environmental health conditions in HCFs provide an identify the current gaps. While in depth, national and sub-national-level studies have been carried out in Zanzibar and Rwanda, these studies did not assess the implementation status of the relevant policies, which will be the focus of this paper (Fakih et al., 2016; Huttinger et al., 2017).

3. Methods

3.1 Study Setting and Facility Selection

Qualitative data were collected from respondents based at health care facilities throughout Malawi and at the Ministry of Health headquarters. Forty-five facilities were purposively selected and interviews were conducted during a two-month period. All facilities in the study were public, i.e., they were staffed and funded by the government. In order to address implementation challenges in all types of HCFs throughout the country, the study was conducted in the Central, Northern, and Southern regions, in all levels of health care facilities, central (tertiary), district, health center, and health post/dispensary. Within each region, one central hospital was assessed. In the northern and central regions, there is only one central hospital while the southern region has two.¹ Additionally, assessments were conducted in 14 districts across the three regions. One district hospital, one health center and one health post were selected in each district. The MoH selected the facilities in each district. The number of districts assessed per region was based on the total population of each region. In total, interviews were conducted at three central hospitals, 14 district hospitals, 15 health centers and 13 health posts or dispensaries, for a total of 44 facilities. One selected facility was not open on the day researchers visited. (See Annex: Table 1 -Malawi: Health Care Facilities Assessed in the Three Regions and 14 Districts.)

The qualitative nature of this study justified the non-probability sampling method used to select HCFs. In order to ensure that all the interviews could be completed during the two-month fieldwork timeframe, the health centre and health post/dispensary from each district were

¹ The Malawian Ministry of Health selected Queen Elizabeth Central Hospital to be included in the study

assessed in one day. Therefore, the health post/dispensary selected was based on its proximity to a health centre. Additionally, health care facilities only accessible by boat were not included in the study due to safety concerns for the data collection team.

3.2 Data Collection

Data were collected to obtain an in-depth understanding of the EH department and the policy implementation process in Malawi. This information was collected using semi-structured interviews (Marshall & Rossman, 2014). There was no previous information on EH policy implementation in Malawi, making this in-depth level of information desirable. Also, interviews were preferable to focus groups because of the sensitive nature of some of the topics being discussed (Tolley et al., 2016). Separate interview guides were developed for Environmental Health Officials (EHOs) at different levels of governance (National, District, and Facility/Community) to account for their different responsibilities within the EH department.

Before traveling to Malawi, information was collected on current national policies related to environmental health conditions in healthcare facilities. This information was used to help guide development of interview questions and to develop an understanding of the role and responsibilities of the EH Department. Additional information was gathered in-country, including the 2017 draft Environmental Health policy.

For all of the interview guides, research questions were organized into main questions/themes along with follow-up questions and probes to be asked if necessary during the interview. For example, the main themes in all interview guides were: Background & training; environmental health policy knowledge and implementation strategies, EH prioritization and budgeting, EH stakeholders, and general comments and recommendations. Relevant questions

were included in each of the thematic areas based on the official responsibilities of each group. For example, within the broader theme of implementation, a specific question for district officials, who are primarily responsible for implementation read:

Could you describe the successes and failures of implementing the environmental health components of existing policies and frameworks, specifically in health care facilities?

This question followed a previous one that gathered the respondent's knowledge of policies, strategies, or implementation frameworks related to environmental health. If the respondent did not address the follow-up questions in their initial response, the interviewer would ask:

- a) In the cases of successes, what has enabled implementation to go smoothly?*
- b) In the cases of failures, what specific challenges arose?*

Semi-structured interviews also allowed the interviewer to ask additional follow-up questions, not included in the interview guide, to gather more detail (Tolley et al., 2016). The interviews were conducted in English. All of the interview guides are available in the supplementary materials (S1).

3.3 Participant Selection

Respondents were selected based on convenience. With some EHOs, there were a number of different potential respondents, because all environmental health officers, starting from the District level, are based at health care facilities. Within each district visited, the District Environmental Health Officer (DEHO) was interviewed. In a few cases, the DEHO was away from the district hospital on the day of the assessment. In this case, the interview took place either with the Deputy District Environmental Health Officer in person or another senior

environmental health official. In the few cases where neither the DEHO nor a more senior official were available, a phone interview was conducted with the DEHO at a later date.

If time permitted, an additional interview was done with another environmental health officer at the district hospital. This interview took place with the available EHO, regardless of his/her position within the EH department. At health centres and health posts, the desired respondent was an Assistant Environmental Health Officer (AEHO). This health officer is responsible for EH at a given health care facility. While all HCFs are supposed to have an AEHO, it was rare to find the AEHO available for an interview. In the absence of the AEHO, other respondents were selected. At the lower level facilities, these were either Senior Health Surveillance Assistants (SHSAs) or Health Surveillance Assistants (HSAs). The only other criterion for inclusion in the study was that the respondents had worked at the health care facility for at least one year to ensure adequate knowledge of the facility. Additionally, four national environmental health officials were interviewed. A similar process was used to select respondents, making an effort to interview the most senior EH officials. Table 2 in the annex presents the total number of officials interviewed.

All participants interviewed in-person provided written consent through a signed consent form. Verbal consent was obtained for the respondents participating in phone interviews. All interviews were recorded with the consent of the participant.

3.4 Transcription

English audio recordings were transcribed by experienced transcribers from UNC Project Malawi.

3.5 Coding

Dedoose, an analysis software for qualitative and mixed methods studies, was used to code the interview transcripts (Dedoose, 2015). The analysis process was inductive (i.e. moving from specific observations to generalizations), so coding and data analysis were structured to allow themes to emerge from the dataset. Throughout the interviewing process, each field team member kept notes both to increase transparency and to assist with the development of a codebook for analysis (Rubin & Rubin 2011).

Group coding took place in two rounds to strengthen the reliability of the codes (Rubin & Rubin, 2011). A first round of codes and a preliminary codebook were developed using weekly summaries from field notes. Throughout the first round of coding, the code book was edited as new ideas and themes emerged. The coding team met weekly to discuss, edit, and approve new codes. The codebook was finalized at the end of the first round.

The final codebook was used for the second round of coding, which was conducted to ensure consistency among data coders and to apply new themes from the finalized codebook to the dataset that emerged during the first round.

3.6 Thematic Analysis

The analysis was based on the Contextual Interaction Theory framework. This framework was initially developed in the 1990s to assess the implementation of environmental protection policies, and was later adapted to cover more policy sectors, including health (Bressers, 1983; Owens, 2008; Spratt, 2009; O'Toole, 2004; De Boer & Bressers, 2011). It asserts that the extent to which a policy is implemented depends on the content of the policy, but also the motivation, information, and power of the actors involved in implementation. Better understanding the

different components influencing the motivation, information, and power of the implementation actors will help identify the barriers to the implementation of EH related policies in Malawi's HCFs.

Researchers analyzed interview excerpts, using codes and co-occurrences to categorize them. These excerpts were then grouped based on the themes of Contextual Interaction Theory: mobilization, information, power, and interaction. Descriptor analysis within Dedoose was used to examine differences in results across levels of government.

3.7 Ethics statement

Ethical approval and all relevant research permits were received from the University of North Carolina at Chapel Hill's Office of Human Research Ethics (approved non-biomedical research project 16-1682), and the Malawi Ministry of Health and Population (approval number 16/7/1624).

4. Environmental Health Department Structure and Results

Of the 53 individual interviews, 34% took place in the Central region, 19% in the Northern region; 40% in the Southern region, and 7% with national officials based at MOH headquarters. Approximately 15% of respondents were female and 85% were male, but all respondents at the national level were male. All respondents discussed topics related to the structure of the EH department and EH policy implementation, based on the perspective of their role in the EH department.

4.1 Environmental Health Department Structure

4.1.1 Decentralization

Malawi's decentralized governance system organizes the department into three main levels: the National Level, the District Level, and the Facility/Community Level. The organization of personnel at each level and their responsibilities are guided by the Environmental Health Policy. At the National Level (Figure 1), officers are based at MOH headquarters.

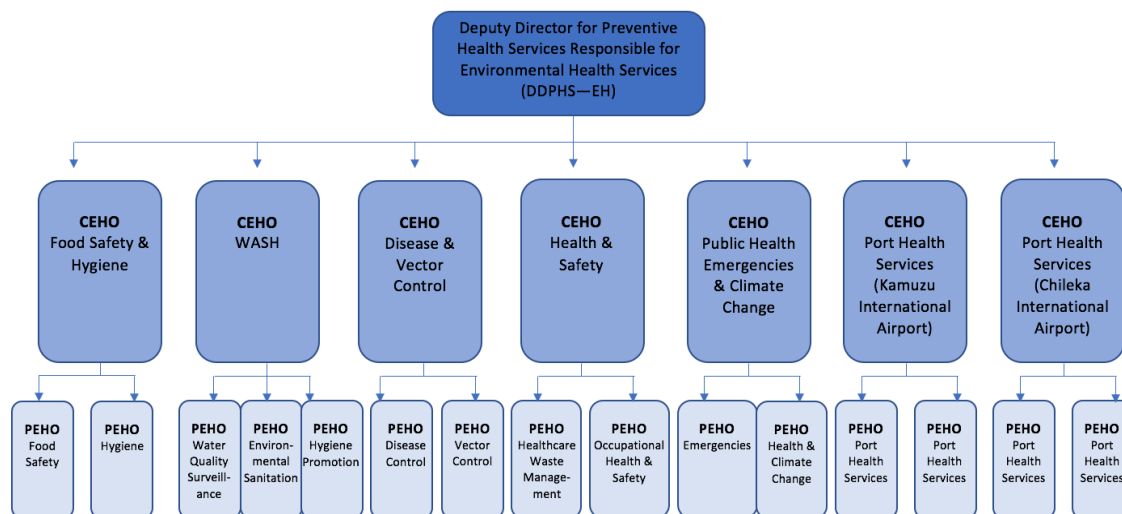


Figure 1: Environmental Health Department—National Level

The highest level EH officer is the Deputy Director for Environmental Health Services Responsible for Environmental Health Services (DDPHS—EH). Below this officer are seven Chief Environmental Health Officers (CEHOs), responsible for different sectors of EH throughout the country. Five of these are responsible for the themes in the EH policy: Food Safety & Hygiene; WaSH; Disease & Vector Control; Health & Safety; and Public Health Emergencies & Climate Change. The other two CEHOs are responsible for Port Health at the two international airports and do not have any responsibilities at the HCFs. There are Principal Environmental Health Officers (PEHOs), who have more specific duties within each theme, e.g. one PEHO for Food Safety and a second for Hygiene within the first theme. All four national level respondents characterized their responsibilities as being related to policy guiding and resource mobilization. The CEHOs are also responsible for aggregating information relevant their sector from each district and referring the information to the DDPHS—EH.

All sub-national levels are based at HCFs, with District level officials at District Hospitals, and Facility/Community level officials at their respective HCF.

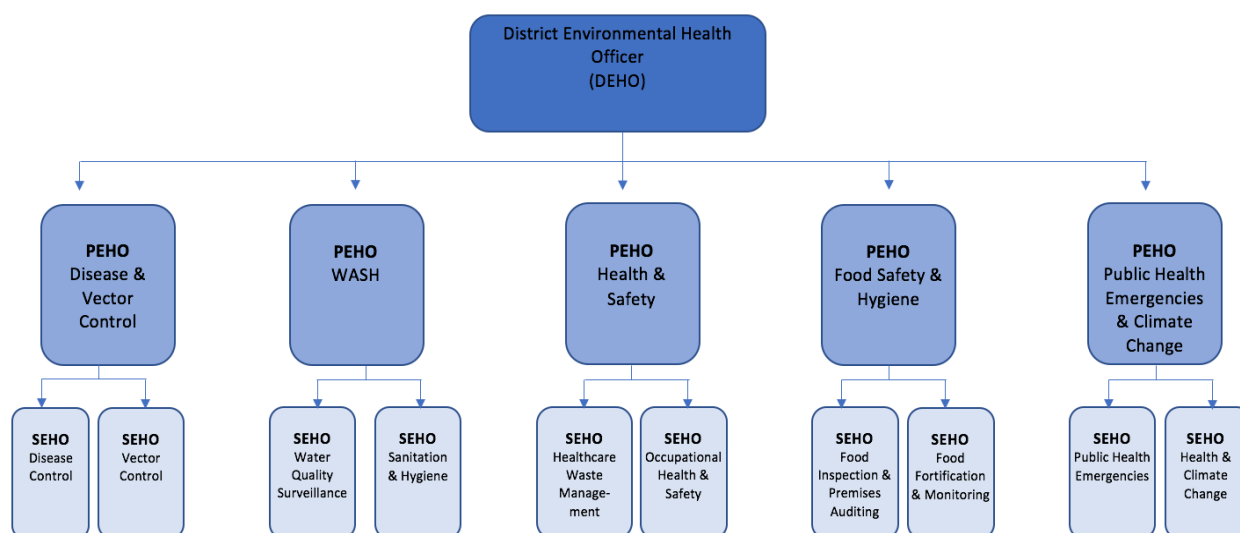


Figure 2: Environmental Health Department—District Level

At the District Level (Figure 2), there is a similar structure, led by the District Environmental Health Officer (DEHO), who is the highest-level implementation officer. These officers are the link between the national office and local structures, and are responsible for all EH activities in their district. These responsibilities include, but are not limited to HCFs. Specific duties include report compilation, inspections at institutions and in the community, program planning, and budget allocations. The District Level Principal Environmental Health Officers (PEHOs)—five in each district as presented in Figure 2—are also organized by the five EH themes captured in the policy. All have Senior Environmental Health Officials (SEHOs) reporting to them; these officials are organized in the same manner as the National Level PEHOs. The District Level Environmental Health Officers are organized into the same categories as the PEHOs and are responsible for two themes.

At the Facility Level (Figure 3), the structure is headed by an Assistant Environmental Health Officer (AEHO), who is responsible for the EH at that facility.

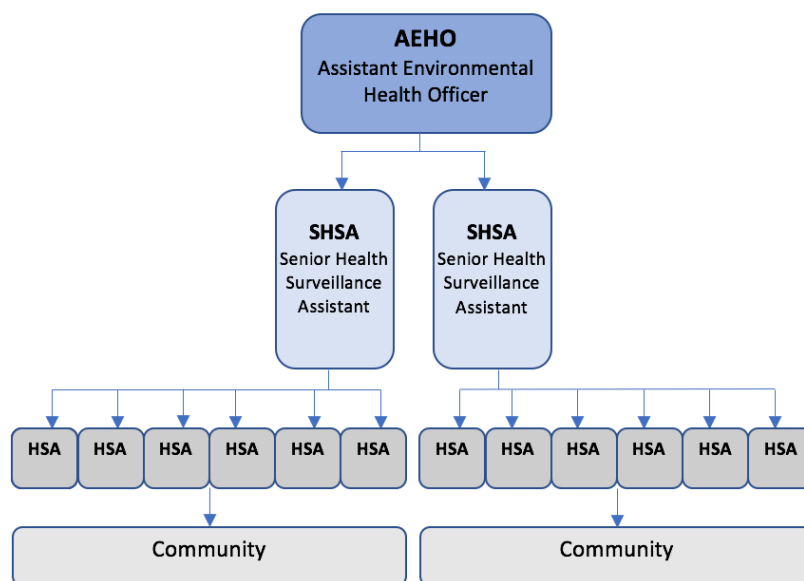


Figure 3: Environmental Health Department —Facility/Community Level

They organize all EH related activities at the HCFs and in the surrounding communities. Senior Health Surveillance Assistants (SHSAs), who report to the AEHO, supervise Health Surveillance Assistants (HSAs). Nine of the eleven SHSAs interviewed identified supervision of HSAs to be their primary responsibility, the other two mentioned supervision but said they also had to assist the HSAs with some of their duties. The job of the HSAs is to link the facilities with their surrounding communities. Each HSA, according to policy, is responsible for 1000 people in their community. Responsibilities mentioned by respondents include conducting health talks, holding under-5 clinics in villages, administering immunizations, family planning, and HIV counseling. The community itself is responsible for implementing EH. While no community members were interviewed, the EH policy states that they should be involved in the planning, implementation, and evaluation of EH activities. All HSAs interviewed also mentioned the involvement of the communities in maintaining EH at the HCFs and in the communities.

4.1.2 Coordination

Coordination between the EH department and non-EH MoH officials, officials from other ministries, and external actors is also organized by government level (Figure 4). The lines on the figure show where lines of communication exist between each committee or council. Given the administrative decentralization, the districts have a lot of autonomy in organizing the coordination of activities, particularly at the District Councils. These councils were the most frequently mentioned coordination structure at the District level, and where EH officials coordinate with district officers from other ministries as well as non-governmental organizations (NGOs) to plan and budget for district activities. Each district prepares a draft annual District

Implementation Plan, based on the needs of the district; this is sent to the respective National Level Ministry officials for review and consideration for funding.

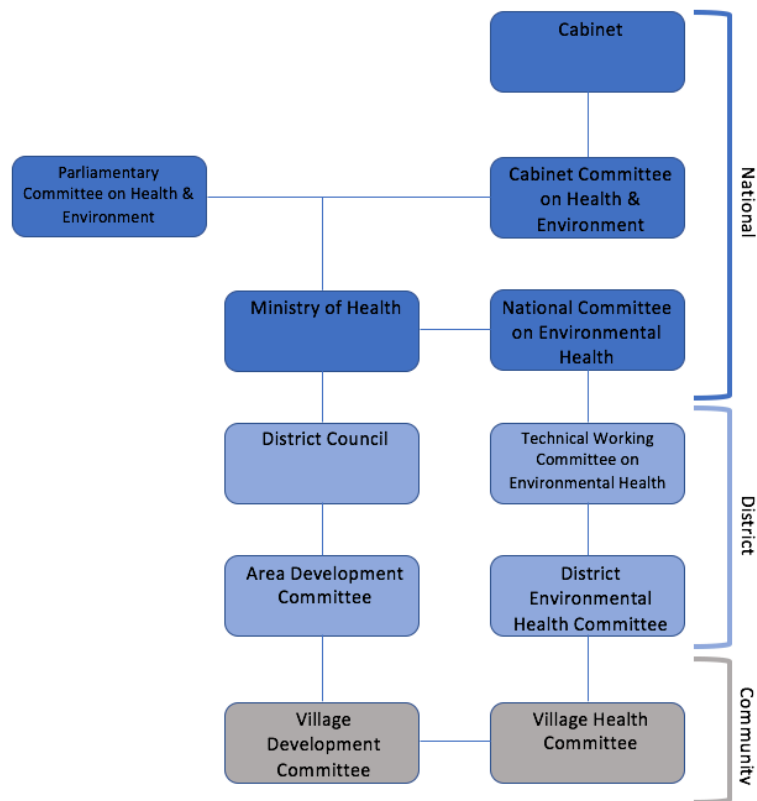


Figure 4: Environmental Health Department Coordination Mechanisms

Once funding is received from each Ministry, the District Council allocates and channels resources directly to facilities and other institutions, rather than sending funding to the facilities. Beyond the District Council, coordination varied in each District. When asked, all respondents mentioned the existence of Area Development Committees, Village Development Committees, Village Health Committees, and usually a Technical Working Committee on Environmental Health. However, there was no apparent normalcy of meeting frequency, responsibilities, or mechanisms to communicate with other committees.

4.2 Successes

Given that less than one-third of countries have an EH policy, the fact that Malawi has developed a modern and progressive is, in and of itself, a success. The EH department is also comprehensive, stretching from the National to the Facility/Community level. Respondents from all levels noted the dedication and competence of the staff within the EH department, which also represents a success.

When probed for a more specific example of a success, community led total sanitation (CLTS) and its ability to increase the number of regions that were open defecation free (ODF) was mentioned 32 times by respondents from all levels of governance. Malawi has invested time and money in CLTS since 2008. District level EHOs noted anecdotally that the success of CLTS programs is what has led to the decrease in cases of cholera and other diarrheal diseases in their districts. Some DEHOs even had collected data on this, but had yet to synthesize the data into reports to be sent to the National government.

4.3 Shortcomings

4.3.1 Contextual Interaction Theory

The implementation of EH policies in Malawi's HCFs depends not only on the structure of the department and the content of the policy, but also on the level of influence of actors responsible for EH conditions in Malawi. Contextual Interaction Theory (CIT) identifies three main characteristics related to influencing actions and interactions:

- a) motivation, which relates to the support given to a policy by an actor;
- b) information, which is the extent and accuracy of information each actor has with respect to the policy; and

c) power, both direct and indirect, which refers to the ability of the actors to control, order and/or persuade others to support the effective implementation of the policy. It is noted that power might be constrained or amplified by external influences (Djellouli & Ouevedo-Gómez, 2015).

This framework includes not just the actors directly involved in the implementation of the policies, but also those who might influence the process in another way. NGOs, who might play a role in coordination of activities or training, even though they are not legally responsible for EH policy implementation, might provide another example.

Each actor's motivation, information, and power are affected by other actors and external forces. Other actors also influence their willingness and ability to implement EH policies in HCFs. Given Malawi's administrative decentralization, actors at the District and Facility/Community Levels have a lot of autonomy, and thus play a vital role in implementing EH policies.

Thematic analysis of interviews with the 53 respondents from all levels of governance was used to identify the successes and barriers to effective implementation according to the CIT framework. Identified barriers include:

- limited financial support for and prioritization of the EH department;
- inadequate community mobilization;
- insufficient knowledge of policies and up-to-date EH matters by EH officials;
- gaps in the EH department staffing leading to lack of supervision and reporting;
- limited data collection and analysis; and
- poor coordination by EH Department personnel with external actors leading to inefficient use of external resources to address existing service gaps.

4.3.2 Motivation

Within the CIT framework, motivation refers to how important an actor considers a policy to be and the degree to which that policy promotes and supports their own goals and objectives. Economic and political support of the EH department, human rights, nepotistic promotions, and poor environmental health conditions at HCFs limit the motivation of EH officials and the communities.

Support for the Environmental Health Department

The Malawian MOH has shown increasing support for the work of the EH department by promoting the development of the Environmental Health and Health Care Waste Management Policies in 2017 and the Community Led Total Sanitation (CLTS) programs throughout the country (Environmental Health Policy, 2017; Health Care Waste Management Policy, 2017). A review of these and other Malawian health policies, like the 2017-2022 Health Sector Strategic Plan, reveals a documented focus on preventive health and EH. Support of EH policies was recognized by all respondents (Health Sector Strategic Plan 2017-2022, 2017). However, the level of support was deemed insufficient given that preventive health and EH continued to receive less support and resources than curative health services.

One National Level official said that 52% of Malawi's diseases are due to poor sanitation and hygiene, but the WaSH budget makes up <1% of the overall health budget for the country. No specific figures were presented for curative services, but the continued prioritization of curative services over preventive was mentioned 61 times by respondents from all levels of governance and judged to be a major barrier to implementing EH policies fully. There were also instances where limited EH funding was redirected to curative services. Two DEHOs mentioned

instances where money allocated by the National Level was redirected at the District Level to curative services to purchase drugs. This action undermined the implementation of EH policies.

The most commonly mentioned examples of insufficient resources for transportation and fuel needed to get to the community, and to repair or replace old or broken down EH infrastructure. These issues were mentioned regularly at the District and Facility/community levels, but were never mentioned at the National level. At the National Level, all respondents mentioned insufficient resources as a challenge within the department, but none could present specific examples of these challenges, beyond suggesting that insufficient resources broadly constrained implementation and the ability of actors to carry out their duties. Respondents at the District Level and all National Level respondents mentioned the importance of lobbying to increase funding to the EH department.

Human Rights

National and District Level officials were asked about the relationship between EH and human rights. Twenty-nine respondents believed a relationship between EH and human rights existed, while the other two found them to be unrelated. Occasionally, specific components of EH, e.g. the availability of clean water, were cited as a basic human right. However, the understanding about human rights was in general terms, e.g. promoting a clean environment as a right for all humans. None of the respondents referenced an/the international rights frameworks.

Nepotistic Promotions

There were many cases where respondents believed that, despite their qualifications, they were not promoted because they did not have the necessary political connections. However, only

two cited their educational background and explained in depth why they believed they were not promoted. Both had Masters of Public Health in EH and noted a distinct lack of equality and fairness regarding hiring decisions and stressed that hiring and promotion was unduly influenced by familial and political relations. One DEHO who believed that he had the qualifications to serve as a policy analyst at MoH headquarters said he might receive a promotion “if my daddy was a minister”. As a result, he and other highly qualified respondents felt undervalued.

Community Involvement in Implementation

The practice of Malawi’s EH department calls for sub-national EHOs to be based at HCFs. This includes the HSAs, who are engaging directly with the communities. The EH policy calls for the community to participate actively in planning, monitoring, and evaluating EH activities. Because the HSAs are coming from the HCFs, the communities look to the HCFs as an example of good EH practices. As a result, when EH conditions at the HCFs are poor, communities are less inclined to carry out their specified duties. There are at least two reasons for non-involvement by the community. Firstly, when prompted, all HSAs highlight the importance of the HCFs serving as models of good environmental practices for the communities. The HSAs believed that the communities needed to see how EH activities should be done by those who have been trained so they would be able to replicate those practices in their communities. Secondly, the HSAs believed that they could not advocate for EH in the community if they came from an HCF with poor EH. In this instance, the community would not find their messages credible, because according to one HSA, “people get what you are doing not what you are saying”.

4.3.3 Information

The CIT framework identifies information as the second component impacting implementation. Successful implementation of the EH policy is full technical knowledge of the terms of the policy and clear and coordinated communications of the terms across all actors.

Implementation barriers related to information include:

- the lack of local stakeholders in the development of the EH policy;
- incomplete and unequal training for EHOs; and
- Ineffective dissemination of policy information.

Development and Ministerial Placement of Environmental Health Policies

The 2017 Environmental Health Policy was drafted by the MoH with financial and technical support from WHO (Environmental Health Policy, 2017). During the consultation stage, other actors were involved, including many Malawian ministries, and other international organizations such as UNICEF and the Red Cross. The organizations, particularly WHO, guided the policy development process and contributed to a progressive understanding of EH. However, local stakeholders, who are responsible for implementation, were not involved in the development of this policy. Thus, those most familiar with the barriers to policy implementation were not able to share this information with those developing the policy.

These implementers are also involved in implementing EH-related policies in other ministries. For example, the National Water Policy and National Sanitation Policy, which include components directly related to EH in HCFs, are housed in the Ministry of Irrigation and Water. Those implementing these components are in the EH department and part of the MoH because, as one DEHO stated, “[other ministries] don’t have the structures on the ground”. For example,

Section 3.6 of the Malawian Sanitation Policy targets HCFs (National Sanitation Policy, 2008). All of the activities in this section are to be carried out and monitored by District Level EHOs. This reality challenges effective coordination of activities across ministries; in effect, the implementers do not have a clear line of communication with those formulating policy change and making budget decisions.

Additionally, three District Level EHOs said that external actors will channel their resources to the ministry where the policy is housed, rather than to the MoH where the implementation is taking place. As a result, resources for a sanitation related activity like building handwashing stations at HCFs, might go to the Ministry of Irrigation and Water, even though EHOs are responsible for ensuring the presence and functioning of proper handwashing stations.

Policy Knowledge

There has been an unequal dissemination of information related to the draft EH policy. All four National Level EHOs talked at length about the 2017 EH policy and other related policies, including details on its development, budgeting, and plans for implementation. Ten out of thirteen DEHOs, who are the highest-level implementation officers were aware of the policy. However, no Facility/Community Level EHOs had knowledge of the policy. As a result, some District Level EHOs are using the EH policy to guide the implementation process, while others still reference the 1948 Public Health Act.

Since the HSAs have no knowledge of the EH policy but who interact with community members, the communities have limited knowledge and understanding of policies and rights.

Since the communities do not know the standards to achieve and maintain, they do not demand improved EH conditions.

The knowledge of policies and programs within the EH department is dominated by the Water, Sanitation, and Health (WaSH) agenda. WaSH was mentioned twice as often as any other component of the draft EH policy when respondents at all levels of government were asked about their job description, roles, and responsibilities (Figure 5). This may reflect the importance of WaSH in the many community and school programs in Malawi. It also demonstrates that EHOs have an incomplete knowledge of their roles. For example, some respondents believed their official duties only included WaSH, despite the fact that WaSH was only one of the five core components of EH outlined in the official policy.

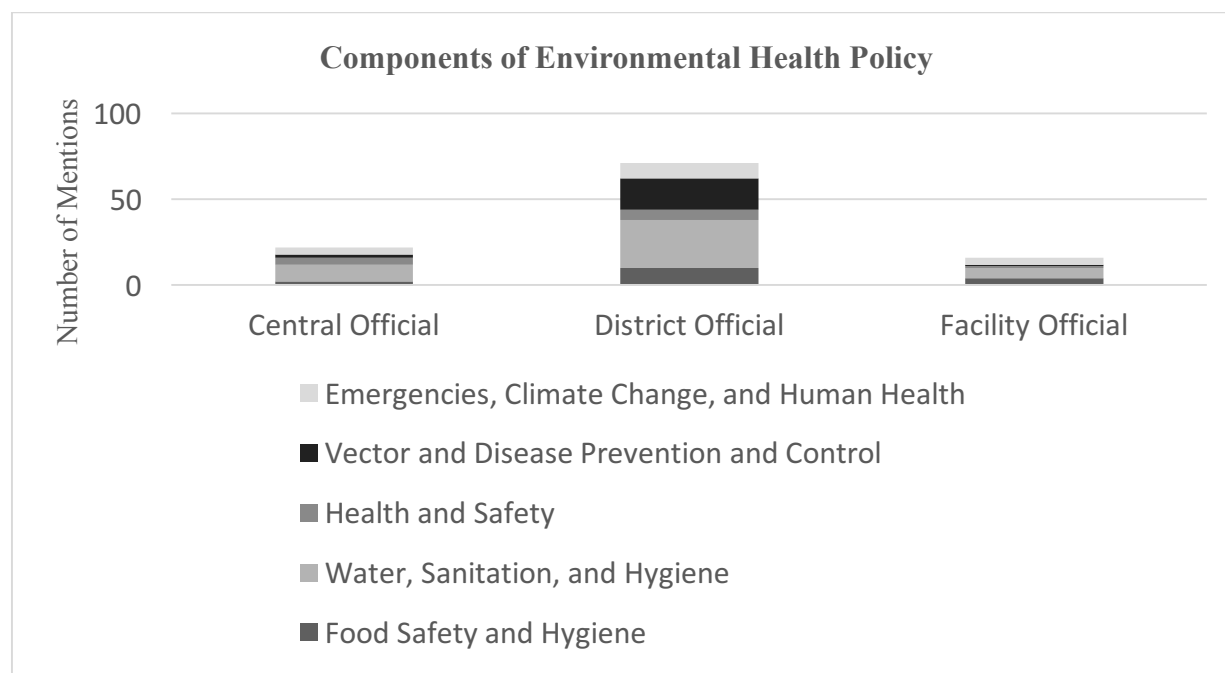


Figure 5: Malawi Environmental Health Policy — Components of EH by Level

Training

Training provided to EHOs is uneven and inconsistent. As a result, there is a wide variation in levels of knowledge, even among those who hold the same position. For example,

some DEHOs have higher-level degrees such as a Master's in Public Health with a concentration in EH, from a university in the United States. Some others have just a certificate in EH. The absence of a training approach providing common content and a consistent instructional pedagogy limits the extent to which EH programing is comprehensively understood. One DEHO with a Master's degree in EH discussed in great detail his plans to apply for international grant funding to support novel EH interventions in his district. While his level of training was above what is expected for this position, this person (DEHO) was an example of the positive and progressive work of the EH department throughout the district. It is noteworthy that his district had some of the best EH conditions in the HCFs.

Refresher trainings for HSAs are few and irregular. No HSAs had received government-sponsored training after appointment to his/her position. In some cases, HSAs had not received refresher training in ten years; other HSAs has not received training in more than twenty years. In cases where HSAs had received training, the sessions were usually sponsored by a non-governmental actor. Since there have been major developments and updates to EH in the past five years alone, knowledge of most HSAs is not current. This has a direct impact on the community and the community's knowledge of EH, the primary location of the HSAs' work.

There is frequent collaboration between HSAs and the village health committees, which are composed of community members who are untrained and receive no compensation. These committees play a significant role in planning and overseeing EH activities at HCFs. Many HSAs believe that these committees would benefit from EH training. HSAs also suggest that NGOs could play a major role in training the village committees because these non-governmental organizations have, in the past, trained both HSAs and community committees.

4.3.4 Interaction and Power

CIT framework includes power and interaction to highlight issues related to those who are empowered to implement a policy and to what degree. This can stem from formal sources, including who the policy itself identifies to be the implementer. It can also derive from informal sources, such as when an actor is dependent on another to achieve a certain objective. In this case, there are power-related issues stretching from the highest level of the MOH down to the communities. Even where there are fully informed and motivated EH actors, the existing power structures within the EH department constrain the ability of EHOs to advocate on behalf of the department. External actors also influence EH agendas and programs.

Advocacy for Environmental Health Resources

Environmental Health is represented at each level of government and within HCFs by competent and qualified staff. However, operations suffer because financial resources are not sufficient to cover implementation costs. As a result, maintenance services are often insufficient, and monitoring procedures are not able to collect vital information on environmental health conditions and to forward this information to the different levels of the system. This leaves the community to step in and use their own funding, i.e. petty cash funds, to supplement maintenance and service gaps. (See Figure 6).

At the same time, District Level officials view the 2017 EH policy as an opportunity to improve data collection processes. These data could be used to advocate for additional EH funding.

Prior to the existence of the EH policy, District Level EHOs found it challenging to advocate for more resources. They believe the existence of the policy will allow them to

reference specific targets and indicators that they are working to achieve. However, they find the connection between implementers at the District Level and policy makers at the National Level to be weak. Eight District Level officials mentioned without prompting that improving this connection is necessary for them to be able to better advocate for EH.

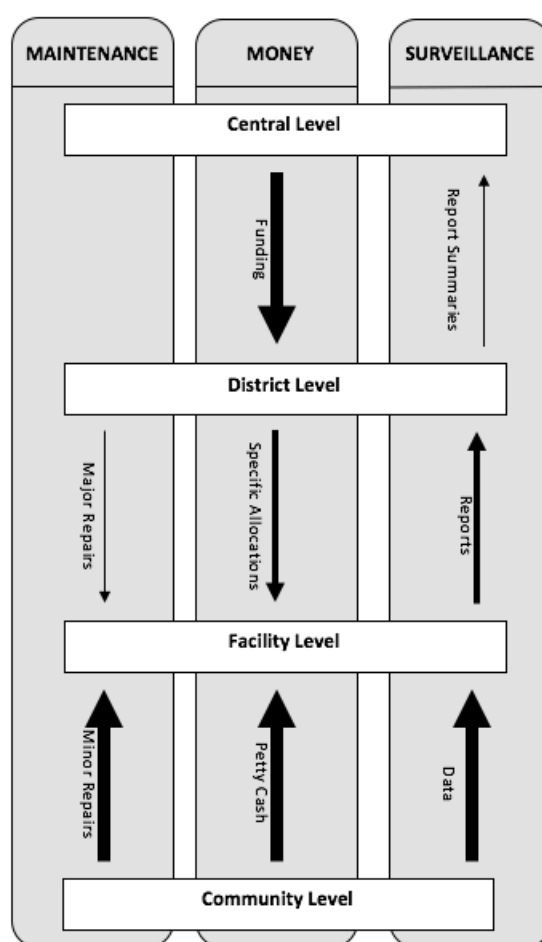


Figure 6: Movement of Environmental Health Information and Resources

Environmental Health Department Staffing

There are two gaps in the EH department staffing; these limit the extent to which policies and related programs are funded and implemented. First, the EH department is not represented at the directorate level, the level at which funding allocations are decided. Medical doctors

dominate this level and lobby to support curative health. Without a Director of EH, the department has limited ability to prioritize and advocate for EH funding. Two National Level EHOs and ten District Level EHOs mentioned the importance of establishing a Directorate Level EH position, without being prompted.

Second, a large percentage of HCFs do not have an Assistant Environmental Health Officer (AEHO). Although 91% of the facilities surveyed had an AEHO assigned to and responsible for the EH at that facility, over 80% of these AEHOs were responsible for environmental health conditions at more than one HCF. As a result, many HCFs are without someone who is exclusively responsible for EH. This leave EH responsibilities to someone who is not trained in EH and who has a curative workload to address. In such cases, EH programming becomes a secondary consideration.

External Actors

There is extensive involvement by NGOs and other external actors in EH in Malawi's HCFs. However, there is limited coordination between these actors and the district government. One District Level EHO said when NGOs and other partners come to their district they state, "This is what we have come for, we are not entitled to do any other activity.' Which means that we even tend to wonder, 'Why did they come to do such a type of activity in our district yet we have our own strategic plan?' They need to go into our strategic plan and pick issues which are very pertinent and which have been prioritized by the district". Many think that NGOs can play a significant and consistent role in supporting EH activities at HCFs. However, it is critical that these agencies coordinate more effectively with local governance to ensure that currently existing programs and interventions are not duplicated.

Community Support

Many HSAs discussed the challenge of obtaining community support for EH activities. They noted that without the presence and support of traditional leaders, it is difficult to introduce and implement EH activities. One SHSA said, “If the relationship between the chief and the HSA is sour, implementation of health care programs becomes difficult”. HSAs believe that open and honest dialogue will ensure amicable relationships.

4.4 Recommendations from Respondents

Each respondent was asked if s/he had any recommendations on how the status of environmental health conditions in HCFs and/or the implementation of EH policies could be improved. Respondents from the Facility/Community Level recommended measures to address practical and tangible needs. Those from the District Level had organizational and advocacy-related recommendations. National Level Officials gave political answers, not related to any specific needs of the department.

All National Level EHOs recommended that the leaders of the EH department continue to advocate on behalf of EH to the committed leaders at higher levels of the MOH. One mentioned that the purpose of this advocacy was to try to obtain increased funding from the MOH, but none recognized any specific effects of decreased funding on the implementation process.

At the District Level, the most common recommendations were to improve coordination with external actors, collect more data to analyze and use as evidence of EH programmatic success, improve the lines of communications between the implementers at the District Level

and the policy formulators at the National Level, and to establish a Directorate Level position for EH. These recommendations are largely structural and logistical. Some District Levels did mention the more tangible needs of the department, but this was rare.

Facility Level Officials most often recommended increased training, staffing, and transportation for HSAs. Others recommended increasing funding to the department, but this was usually in conjunction with addressing other need mentioned above. The absence of training, staffing, and transportation are all concrete needs of the department that stem directly from incomplete implementation of EH policies.

5. Discussion

Factors limiting the implementation of EH related policies in Malawi's HCFs are interwoven throughout the CIT framework. Because respondents all came from the EH department, most recommended changes that could be made within the department. However, it is also clear that because of the interlinked nature of these barriers, full solutions will have to be both multilevel and multi-sectoral.

5.1 Prioritization of Environmental Health

Low funding levels are the primary constraint to implementing EH policies fully in Malawi's HCFs. This is partially due to Malawi's national financial constraints. However, funding allocations are closely linked with the country's priorities. In non-healthcare settings, such as communities and schools, EH is not as strongly confronted with the curative versus preventive conflict. This tension dominates discussions of funding and prioritization within the Ministry of Health. Health officials constantly use the phrase "prevention is better than a cure". In addition, policies have been drafted with strong language in support of EH, and the MOH takes a public stance on its support of the EH department. Despite this, the department regularly receives inadequate funding as curative health services continue to be prioritized.

The current lack of effective research and data collection related to EH in HCFs limits the ability of EH actors to advocate for more funds. With the development of the 2017 EH policy, actors in Malawi have a chance to implement data collection and analysis. Also, they will have a stronger motivation to use data, given that the existence of an EH policy offers measurable

targets for them to evaluate and improve. The dedication of existing EHOs to advocate for the department is promising in conjunction with the policy itself which can act as an advocacy tool.

There is an additional advocacy opportunity at the National Level. Establishing a Directorate Level Environmental Health position would give a voice to EH in the MOH budgeting process. This would also provide increased visibility of EH research and programs. The MOH regularly asserts the importance of preventive health, which includes EH. By naming a Director of EH, the MOH would follow through on the verbal support.

5.2 Environmental Health Department

The structure of the EH department is comprehensive in its design, doing well to connect each level of governance. However, when the department is not fully staffed, the gaps in the system create barriers to the flow of information and resources, and limit the ability of EHOs to coordinate activities for the implementation of policies.

The ideal solution would be to fill all staffing positions. Given the financial constraints of the EH department and Malawi as a whole, this may be unrealistic. The decision to not fully staff the AEHO position throughout the country has had expressed, negative impacts on EH in HCFs. In the absence of an AEHO, not only is there no one to oversee the facility's EH and supervise lower level EHOs, but communication between the Facility/Community Level and the District Level is missing.

The rigid structure of the EH department would likely work well if fully staffed, ensuring all activities are completed in an organized and efficient manner. Each position from the National Level to the Facility/Community Level has clear job descriptions and explicit duties. Rarely did we find EHOs who took on duties outside of their job description. Because of this,

without crucial linkages such as AEHOs, the system begins to breakdown. Because of the rigidity of the department, instead of other actors stepping in to fill gaps as needed, the activities of the absent EHO are not implemented. The department would be better served if certain EHOs could be assigned several duties, rather than not staffing certain positions. For example, instead of having a separate PEHO in each district responsible for Vector Control and Disease Control, the responsibilities could be combined into a singular position. This would put a heavy workload on one person, but may be preferable to not having someone responsible for a given set of duties within the department.

5.3 Stakeholder Coordination and Engagement

While the depth and breadth of stakeholder coordination could not be explored by just interviewing officials from the EH department, some barriers were identified. The level of coordination between District Level officials and external actors, particularly NGOs, was one such barrier. NGOs often come to Malawi with their own funded programs, based on achieving a specific objective such as improved sanitation facilities at HCFs. District Level officials emphasized that it was rare for NGOs to consider sub-national level needs. This is unsurprising given how little data are available. However, DEHOs want NGOs to work within their District Implementation Plan (DIP) to address funding and programmatic gaps, rather than promoting their agenda and sometimes duplicating government-sponsored activities.

If DEHOs were to coordinate a resource mapping activity when preparing the DIPs each year, NGOs could be more fully integrated. While drafting the DIP is a collaborative process across several sectors, there is no coordination between different districts. If a resource mapping activity were conducted, this information could be made available to all partners interested in

engaging in projects in Malawi. They process would more efficiently and effectively target an intervention or project to a district with specific needs.

There is also a need to more fully engage important members of the community in EH programming and activities. This includes traditional and religious leaders whose perspectives strongly influence community thinking. Additional research is needed to understand the extent to which these leaders influence community thinking and priority setting. From the perspective of the HSAs, this is very important information. When an HSA does not have a good relationship with community leaders, the community is not as interested in engaging in EH activities. At present, however, the EH policy does not currently detail ways for Facility/Community Level officials to engage traditional and religious leaders.

5.4 Training and Capacity Building

It is unrealistic to expect a policy to be implemented if the implementers do not know and are not trained on the policy. Introducing the new EH policy in Malawi calls for training all EHOs. Each EHO should have functional knowledge of the goals and programs detailed in the policy, and know how these relate to their specific duties. Providing sufficient training will allow has to provide correct information and training to communities. These trainings could be carried out by the government, but there is also support for inviting an external actor to come into Malawi to organize and conduct these trainings.

If possible, the training should be extended to non-EH workers in healthcare settings. This would sensitize them to the importance of EH and preventive health. It would also leave personnel who are trained in EH at a HCF, in the absence of an EHO. This could be especially important in facilities where the AEHO is only present a few times each month.

5.5 Limitations

Because this study operated within a larger assessment of EH at HCFs, respondents were limited to those who were a part of the EH department. This limits the perspectives on EH policy implementation, which is an explicitly multi-sectoral project. However, given the extremely limited information available on EH policies and implementation processes prior to this study, it would have been difficult to identify other relevant stakeholders.

Further research is needed to understand all the EH implementation actors, particularly those in the informal actors. The information provided by these other actors can help to identify district level differences between coordination, and suggest how the differences might impact the implementation process. Without this breadth of information, the solutions and recommendations will be limited as they will only focus on improvements within the MoH and EH department. This information alone will not provide in-depth recommendations outlining on how to improve coordination across ministries at both the National and District Levels.

There is also a need to engage community members involved in EH committees and activities to develop a better understanding of how different communities engage in EH at HCFs and in the implementation process.

5.6 Conclusion

Malawi's government is decentralized, but still functions in a centralized manner. The Ministry of Health is no exception to this pattern. The information and knowledge that exists among those who work at the implementation level does not adequately reach those who are making funding and policy decisions. Some of these issues are straightforward—the HSAs need

more motorbikes and fuel to carry out their duties in the communities and all EHOs need refresher trainings. Others issues are more structural and relate to how EHOs coordinate across levels of governance. Given that National Level officials spend little time on the ground, it is important for them to consider the voices of those who are engaged in the implementation process. Respondents from this study have offered several, actionable solutions to the barriers of EH policy implementation in Malawi's HCFs. Contextual Interaction Theory offers a framework to address various barriers to successful implementation, from the most straightforward to the most abstract. Because the barriers are largely intertwined; a complex, multilevel and multi-sectoral approach with engagement and action by all stakeholders is needed to address them. In addition, many smaller and more rapidly executed changes with the potential to make substantial progress in improving the implementation process could be considered.

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ANNEX

Table 1 Malawi: Health Care Facilities Assessed in the Three Regions and 14 Districts					
REGION	CENTRAL HOSPITAL	DISTRICT	DISTRICT HOSPITAL	HEALTH CENTRE	HEALTH POST/DISPENSARY
<i>NORTH</i>	Mzuzu CH	Karonga	Karonga DH	Iponga HC	Mlare Disp.
		Rumphi	Rumphi DH	Mzokoto HC	Jalawe Disp.
		Nkhata Bay	Nkhata Bay DH	Kanda HC	Mwaya Disp.
<i>CENTRAL</i>	KAMUZU CH	Dowa	Dowa DH	Dzaleka HC	Chibwata HP
		Salima	Salima DH	Chipoka HC	Mchoka HC*
		Dedza	Dedza DH	Golomoti HC	Mdeza HP
		Mchinji	Mchinji DH	Mkanda HC	Gumba Disp.
		Kasungu	Kasungu DH	Mtunthama HC	Dwangwa Disp.
<i>SOUTH</i>	QUEENS CH	Mangochi	Mangochi DH	Namwera HC	Chiponde HP
		Balaka	Balaka DH	Chendausiku HC	Namanolo Disp.
		Chikwawa	Chikwawa DH	Ndakwera HC	Bereu HP

		Mwanza	Mwanza DH	Kunenekude HC	Kapise HP**
		Thyolo	Thyolo DH	Magunda HC	Amelika Disp.
		Mulanje	Mulanje DH	Chonde HC	Chisitu HP
<p>*Mchoka Health Centre was mislabeled as a Health Post by the Ministry of Health, so two assessments were done at Health Centres in Salima district</p> <p>**Kapise Health Post was not open on the day the assessment was scheduled and time constraints prevented the field team from being able to assess a different facility, so no assessment was carried out at a health post or dispensary in Mwanza district</p>					

Table 2	
Environmental Health Official interviews	
Job Title	Number interviewed
National level Officer	4
Principal Environmental Health Officer	2
District Environmental Health Officer	13
Deputy District Environmental Health Officer	3
Environmental Health Officer	8
Assistant Environmental Health Officer	2
Senior Health Surveillance Assistant	11
Health Surveillance Assistant	10
	53